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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

WARTALOWICZ, PAUL A

ART UNIT

PAPER NUMBER

1793

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/624,944	Applicant(s) CHEN ET AL.	
	Examiner PAUL A. WARTALOWICZ	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 February 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 and 9-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 9-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 2/17/10 have been fully considered but they are not persuasive.

Applicant argues that Woditsch teaches precipitating hydroxides while the current invention reacts a titanium containing solution with a barium containing solution in the presence of an excess of OH^- ions to obtain barium titanate powders.

However, Woditsch is relied upon to teach precipitating hydroxides at a constant pH value for the purpose of obtaining commercially possible reactive hydroxides from alkaline earth metal hydroxides (col. 2) as described in the rejection, below. The claim does not require (1) an excess of hydroxide ions or (2) that barium titanate is formed during the reaction step in which the hydroxide concentration is kept constant. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., (1) an excess of hydroxide ions or (2) that barium titanate is formed during the reaction in which the hydroxide concentration is kept constant) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

The claim recites in pertinent part "while maintaining the reaction mixture at a constant OH^- concentration, then filtrating and washing the resulting powdery reaction product...and...**drying to obtain barium titanate** powders" (emphasis added). It

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appears from the claim language that barium titanate is only formed after the drying step. The claim only requires that a "powdery reaction product" is formed during a reaction at constant hydroxide concentration.

Applicant argues that the drying step of the present invention is different from the calcination step required by Woditsch. While drying is different from calcination, the claim does not exclude a calcination step. During the calcination process of Woditsch, the reaction product would be dried as well. Additionally, Harada is relied upon obtaining barium titanate after a drying step. Woditsch is not relied upon to teach drying the reaction product to obtain the barium titanate.

Applicant argues that some additional teaching or suggestion is needed for maintaining a constant pH during the additional reaction steps of aging and hydrothermal treatment in Harada and that Woditsch fails to teach this.

However, the rejection does not rely on the aging and hydrothermal treatment of Harada being carried out at a constant hydroxide concentration. Only the step of the process in which the starting materials are reacted to form an intermediate is carried out at a constant hydroxide concentration. Applicant points to paragraph [0035] of the publication for the present invention that crystalline barium titanate is produced immediately after the reaction of the barium and titanium salts. However, the claim does not require this. The powdery reaction product formed by reaction of the barium and titanium salts is not necessarily, or defined as, barium titanate. Consequently, the

powdery reaction product can be a hydroxide intermediate product in accordance with Woditsch.

Applicant argues that neither Vita nor Uedaira teach maintaining the reaction mixture at a constant hydroxide concentration.

However, neither Vita nor Uedaira are relied upon to teach maintaining the reaction mixture at a constant hydroxide concentration. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Vita is relied upon to teach that the rate of flow and concentration of the solution is varied for the purpose of controlling the crystal form and particle size of the barium titanate crystals (col. 2, lines 55-60), as described in the rejection below.

Uedaira is relied upon to teach that the pH of the reaction between Ba/Ti salts and a base is 13.5 (col. 4, 6) for the purpose of precipitating hydroxides of Ba/Ti (col. 4, 6), as relied upon in the rejection below.

Applicant argues that Buchanan discloses a dielectric composition including zirconium oxide in an amount of 0.5-20 wt%.

However, Buchanan also teaches barium titanate not containing zirconium oxide (col. 2, lines 60-65). See also Figure 1 of Buchanan. The use of patents as references

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is not limited to what the patentees describe as their own inventions or to the problems with which they are concerned. They are part of the literature of the art, relevant for all they contain. MPEP 2122.

Applicant also argues that Harada arguably contains zirconia as well because the particles are pulverized in a ball mill containing zirconia beads [0128]. However, this contact with zirconia does not appear to impart any zirconia to the barium titanate composition as they are only meant to impart pulverization and mixing to the barium titanate particles.

Additionally, the remarks of the Office Action mailed 8/17/09 in response to Applicant's arguments filed 6/2/09 are incorporated herein.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 10-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Buchanan et al. (US H987).

Buchanan teaches a barium titanate powder having a particle size of about 1.0 micron which is sintered to provide a ceramic having fine, homogenous grains of barium titanate and a dielectric constant of about 2000 at a temperature of 160°C (this teaching appears to meet the limitation of uniform microstructure, col. 3, 4, fig. 1).

Regarding the limitation of being approximately spherical, it appears that Buchanan teaches a particle having a size of about 1.0 micron that is ball milled (col. 3,4). Therefore, it appears at least some of the particles having a size of approximately 1.0 micron that have rounded edges as a result of ball milling. This is some evidence that the barium titanate particle is approximately spherical.

Regarding the limitation of a powder consisting essentially of primary crystalline particles, it appears that Buchanan teaches barium titanate powder having a particle size of about 1.0 microns. Because applicant's specification does not disclose what should be excluded in a "consisting essentially of" claim, "consisting of" is interpreted as "comprising."

Additionally, zirconia is added to the barium titanate powder prior to sintering to form a ceramic. However, it does not appear that the "consisting essentially of" transitional phrase excludes this zirconia.

A consisting essentially of claim occupies a middle ground between closed claims that are written in a consisting of' format and fully open claims that are drafted in a comprising' format." PPG Industries v. Guardian Industries, 156 F.3d 1351, 1354, 48 USPQ2d 1351, 1353-54 (Fed. Cir. 1998). See also Atlas Powder v. E.I. duPont de Nemours & Co., 750 F.2d 1569, 224 USPQ 409 (Fed. Cir. 1984); In re Janakirama-Rao, 317 F.2d 951, 137 USPQ 893 (CCPA 1963); Water Technologies Corp. vs. Calco, Ltd., 850 F.2d 660, 7 USPQ2d 1097 (Fed. Cir. 1988). For the purposes of searching for and applying prior art under 35 U.S.C. 102 and 103, absent a clear indication in the specification or claims of what the basic and novel characteristics actually are,

"consisting essentially of" will be construed as equivalent to "comprising." See, e.g., PPG, 156 F.3d at 1355, 48 USPQ2d at 1355 ("PPG could have defined the scope of the phrase consisting essentially of" for purposes of its patent by making clear in its specification what it regarded as constituting a material change in the basic and novel characteristics of the invention.") MPEP 2111.03 [R-3].

Claim 10 is rejected under 35 U.S.C. 102(b) as being anticipated by Harada et al. (U.S. 2002/0090335).

Harada teaches a ceramic produced by sintering barium titanate particles [0092] having a spherical morphology [0113]. Additionally, it appears that some particles have a uniform size and thus make up primary crystalline particles having a uniform particle size. Because applicant's specification does not disclose what should be excluded in a "consisting essentially of" claim, "consisting of" is interpreted as "comprising."

A consisting essentially of claim occupies a middle ground between closed claims that are written in a consisting of' format and fully open claims that are drafted in a comprising' format." PPG Industries v. Guardian Industries, 156 F.3d 1351, 1354, 48 USPQ2d 1351, 1353-54 (Fed. Cir. 1998). See also Atlas Powder v. E.I. duPont de Nemours & Co., 750 F.2d 1569, 224 USPQ 409 (Fed. Cir. 1984); In re Janakirama-Rao, 317 F.2d 951, 137 USPQ 893 (CCPA 1963); Water Technologies Corp. vs. Calco, Ltd., 850 F.2d 660, 7 USPQ2d 1097 (Fed. Cir. 1988). For the purposes of searching for and applying prior art under 35 U.S.C. 102 and 103, absent a clear indication in the specification or claims of what the basic and novel characteristics actually are,

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“consisting essentially of” will be construed as equivalent to “comprising.” See, e.g., PPG, 156 F.3d at 1355, 48 USPQ2d at 1355 (“PPG could have defined the scope of the phrase consisting essentially of for purposes of its patent by making clear in its specification what it regarded as constituting a material change in the basic and novel characteristics of the invention.”) MPEP 2111.03 [R-3].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1, 5-7, and 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harada et al. (U.S. 2002/0090335) in view of Guo et al. (U.S. 6827916) and Woditsch et al. (U.S. 4173485).

Harada teach a process for producing a dielectric material [0035] comprising spherical barium titanate particles wherein the Ba/Ti ratio is greater than one [0001]

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wherein the particles are sintered into a ceramic body [0055, lines 1-4] wherein the barium titanate is produced by mixing titanium tetrachloride [0068, lines 3-5] with barium chloride or barium nitrate [0071, lines 1-4] wherein the barium chloride or barium nitrate is introduced with an aqueous alkali solution [0071, lines 4-6] such as sodium hydroxide, potassium hydroxide or ammonia water [0069, lines 1-3] and the aforementioned reactants mixed to produce a reaction solution is aged at a temperature of 40 to 100°C [0076, lines 3-7] and then subjecting the reaction solution to hydrothermal treatment at a temperature of from 100 to 350°C [0079, lines 1-4] wherein the particles obtained are filtered [0112, lines 14-15] then washed with water and dried [0080, lines 1-3].

Harada fail to teach that the amount of OH⁻ is constant.

Woditsch teach a process for making alkaline earth titanates (col. 1) wherein precipitating hydroxides at a constant pH value for the purpose of obtaining commercially possible reactive hydroxides from alkaline earth metal hydroxides (col. 2).

As Woditsch teaches precipitating hydroxides at a constant pH value for the purpose of obtaining commercially possible reactive hydroxides from alkaline earth metal hydroxides (col. 2), it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a constant pH in the reaction of Harada that reacts Ba/Ti salts with a base to form hydroxides.

Additionally, it appears that a pH of 13.5 is so close a pH of about 14 that one skilled in the art would have expected it to have the same properties. *Titanium Metals Corp. v. Banner*, 227 USPQ 773.

Regarding the limitation wherein the reaction takes place in a high-gravity reactor, Guo teach a process for producing a fine powder (col. 1, lines 11-14) wherein reactions take place in a high-gravity reactor such that the centrifugal acceleration is 20-40000 m/s² (20-40000 m/s² is within the range of 1.25G to 12500G) for the purpose driving the reaction to completion (col. 6, lines 5-10).

Therefore, it would have been obvious to one of ordinary skill in the art to provide wherein reactions take place in a high-gravity reactor such that the centrifugal acceleration is 20-40000 m/s² (20-40000 m/s² is within the range of 1.25G to 12500G) in Harada et al. in order to drive the reaction to completion as taught by Guo.

Harada additionally teaches sintering the barium titanate particles to form a ceramic [0092].

As to the limitation wherein the ceramic exhibits uniform microstructures, uniform particle size, homogenous chemical compositions, small grain sizes, and a dielectric constant of up to 2500, Harada teach the aforementioned process for producing barium titanate wherein the prior art process is substantially similar to the claimed process such that the product produced by the prior art process has the same properties of the claimed process such as consisting essentially of primary crystalline particles having a uniform particle size and an approximately spherical morphology.

Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harada et al. (U.S. 2002/0090335) in view of Guo et al. (U.S. 6827916) and Woditsch et al. (U.S. 4173485) and Vita et al. (U.S. 2985506).

Harada teaches a method as described above in claim 1.

Harada fails to teach the limitations wherein the concentration of metal ions ($\text{Ba}^{2+} + \text{Ti}^{4+}$) ranges from 0.1 to 2.0 mol/L and wherein the base concentration in the solution (II) ranges from 3 to 15 mol/L and wherein the flow rates of the solutions range from 5 to 300L/h and the flow rate ratios of the solutions range from 0.5 to 10

Vita, however, teaches a process for producing barium titanate particles (col. 1, lines 18-20) wherein the rate of flow and concentration of the solution is varied for the purpose of controlling the crystal form and particle size of the barium titanate crystals (col. 2, lines 55-60).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to vary the rate of flow and concentration of the solution in Harada in order to control the crystal form and particle size of the barium titanate crystals (col. 2, lines 55-60) as taught by Vita

From this disclosure, it would be obvious to vary the flow rates of the reactants, including the alkali solution (hydroxide ions) because such variance and their properties could be discovered through routine experimentation.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harada et al. (U.S. 2002/0090335) in view of Guo et al. (U.S. 6827916) and Woditsch et al. (U.S. 4173485) and Kawamoto et al. (U.S. 2003/0022784).

Harada teach a process for producing barium titanate as described above.

Harada fail to teach the limitation wherein the Ba/Ti molar ratio is from 1.2 to 2.0.

Kawamoto teach a process for producing barium titanate [0003, lines 1-3] wherein the Ba/Ti molar ratio is 1.16 [0022, lines 1-5] for the purpose of producing the desired stoichiometry of barium and titanium [0016, lines 10-13]. The prior art range is so close that one skilled in the art would have expected it to have the same properties. *Titanium Metals Corp. v. Banner*, 227 USPQ 773.

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to modify the Ba/Ti molar ratio in Harada in order to produce the desired stoichiometry of barium and titanium as taught by Kawamoto.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harada et al. (U.S. 2002/0090335) in view of Guo et al. (U.S. 6827916) and Woditsch et al. (U.S. 4173485) and either one of Uedaira et al. (U.S. 4520004) or Kerchner (U.S. 6129903).

Harada teach producing barium titanate powders as described above.

Harada fail to teach the pH value of the reaction mixture is maintained constant at about 14.

Uedaira teach a process for making barium titanate (col. 1) wherein the pH of the reaction between Ba/Ti salts and a base is 13.5 (col. 4, 6) for the purpose of precipitating hydroxides of Ba/Ti (col. 4, 6).

Kerchner teach a process for producing barium titanate powders (col. 1, lines 13-15) wherein the addition of the barium source increases the pH of the reaction mixture to about 13 (col. 5, lines 22-25) for the purpose of promoting the reaction (col. 5, lines 23-25).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide wherein the addition of the barium source increases the pH of the reaction mixture to about 13 or 13.5 in Harada in order to promote the reaction (Kerchner, col. 5, lines 22-25) as taught and produce hydroxides of Ba/Ti (Uedaira, col. 4, 6) by Kerchner or Uedaira.

Additionally, it appears that a pH of 13 is so close a pH of about 14 that one skilled the art would have expected it to have the same properties. *Titanium Metals Corp. v. Banner*, 227 USPQ 773.

Additionally, a pH of at least 13.5 overlaps with the claimed value of about 14.

In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990) (The prior art taught carbon monoxide concentrations of "about 1-5%" while the claim was limited to "more than 5%." The court held that "about 1-5%" allowed for concentrations slightly above 5% thus the ranges overlapped.); In re Geisler, 116 F.3d 1465, 1469-71, 43 USPQ2d 1362, 1365-66 (Fed. Cir. 1997) (Claim reciting thickness of a protective layer as falling within a range of "50 to 100 Angstroms" considered prima facie obvious in view of prior art reference teaching that "for suitable protection, the thickness of the protective layer should be not less than about 10 nm [i.e., 100 Angstroms]." The court stated that "by stating that suitable protection' is provided if the protective layer is about' 100 Angstroms thick, [the prior art reference] directly teaches the use of a thickness within [applicant's] claimed range."). MPEP 2144.05 (I).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PAUL A. WARTALOWICZ whose telephone number is (571)272-5957. The examiner can normally be reached on 8:30-6 M-Th and 8:30-5 on Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Paul Wartalowicz
May 17, 2010

/Stanley Silverman/
Supervisory Patent Examiner, AU 1793